DOCUMENT RESUME

ED 227 898 JC 830 111

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TITLE Computer Service Technology (An Associate Degree Program).
INSTITUTION Delaware County Community Coll., Media, Pa.
PUB DATE Feb 83
NOTE 13p.
PUB TYPE Reports - Descriptive (141)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Community Colleges; Computers; *Computer Science Education; Employment Projections; *Labor Market; Program Descriptions; Program Design; *Program Development; Salaries; *Technical Education; Two Year Colleges
IDENTIFIERS *Computer Service Occupations

ABSTRACT

Delaware County College's (DCC's) computer service technology program is described in this paper, along with job market needs for computer personnel in Delaware County and nationwide. First, the type of work performed by computer service technicians and the areas in which they are employed are outlined. Next, the objectives of DCC's program are identified, i.e., enabling students to: (1) diagnose and solve systems problems; (2) diagnose and troubleshoot hardware and software problems; (3) differentiate between hardware and software problems; (4) construct hardware prototype systems; (5) generate software; (6) analyze signal flow on a systems level; (7) perform system calibration and testing; and (8) interface terminals and peripherals with computer systems. Then, a brief analysis of the national computer service job market projects an increase from 83,000 to 160,000 jobs in the next decade; an overview of local salaries reveals them to range between $13,000 and $17,000; and comments from local employers indicate a substantial and growing demand for computer personnel. Next, lists are provided of potential employers in the Delaware Valley area; the members of the Computer Service Technology Advisory Committee; and the courses offered and credits available in DCC's four-semester program. After the needs addressed by the program, the constraints on its establishment, and program and capital costs are specified, enrollment projections and advertising methods are discussed. (HB)

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COMPUTER SERVICE TECHNOLOGY

(AN ASSOCIATE DEGREE PROGRAM)

DELAWARE COUNTY COMMUNITY COLLEGE

MEDIA, PENNSYLVANIA

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FEBRUARY, 1983

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Computer Service Technology Program

Program Description

Computer systems perform a wide variety of tasks in business and industry. Keeping the systems in working order is the responsibility of computer service technicians.

Computer service technicians not only do repair work, but also provide regular scheduled maintenance checks to prevent emergency breakdowns of equipment. Some computer technicians install new equipment, while others design and develop maintenance and repair schedules and manuals. Some technicians specialize in a particular computer model or system or in a certain type of repair.

Most computer service technicians are employed by the manufacturers of computer equipment or by firms that contract to provide maintenance service to a manufacturer's customers. A few are employed directly by organizations that have large computer installations (Dow Jones-Irwin, 1980).

Program Objectives

1. Solve systems problems
2. Diagnose and troubleshoot hardware
3. Diagnose software
4. Differentiate between software and hardware problems
5. Construct hardware prototype systems
6. Generate software
7. Analyze signal flow on a systems level
8. Perform system calibration and testing
9. Interface terminals and peripherals and computer systems
10. Develop organizational, procedural and systematic skills in the diagnosis of systems problems.

Job Market Analysis

According to Dow Jones-Irwin (1980), there are about 50,000 computer service technicians, and the field is expanding rapidly. The increase in the number of educated technicians will almost entirely be because of the rising demand for computers, and not as a result of natural attrition (death or retirement).

The U.S. Department of Labor, in their usual efficient manner, has been more specific and less general; they project an expected increase from 83,000 to 160,000 jobs over the next decade. This projection is correlated to the dramatic rise in the number of computers. In 1980, more than 600,000 computers were in use, compared with only about 100,000 in 1970.

Presently, most all businesses, industries and educational institutions possess a computer system. Additionally, home use of micro-computers has reached an epidemic level in this country and industrial nations. A recent article in The Philadelphia Inquirer discussed the issue of rapid computer growth and "service". Their remarks echo the paramount objective of the Computer Service Program, "Along with every new technological marvel comes the age-old question: What happens if it breaks down?"

It is projected that the computer industry will continue to rapidly grow. Coupled with this growth will be needs for technically educated individuals to meet this need.

Salary

A recent survey of local employers projects the salary range and average salary to be:

Starting Salary Range	Average Starting Salary
$13,000-$17,000	$15,000

Job Market (Local/National)

Local - The following comments were made by local employers regarding the need for individuals educated in the computer service field.

"There is a great need. We (the industry) just started."

"10 to 20% growth in the industry as a whole."

"We anticipate growth in the computer service area, with additional systems being installed."

"It is expected that growth will be in the 50-70% range."

"Growirg need for competent technicians."

"The opportunities in this field are unlimited."

"Due to the advent of personal computers and more microprocessor-based equipment, demand should increase."

"Long-term there should be an increasing demand because everyone is using microprocessor controls to replace mechanical parts."

"Increasing need with the rapid growth of smaller systems and 'personal' computers."

"With the advent of personal computers and widespread usage in business, the opportunities for technicians with technical skills are unlimited."

"Need is expanding daily."

"We can use a larger service force."

"Absolutely, the field should grow."

"Field is growing -- room for more technicians."

"We are expanding now and are in need of people."

"Certainly is (need), there are few people servicing micros."

National - Reported earlier, under the title of, Job Market Analysis, were the national projects on labor market needs for educated individuals in computer service. Recent articles in the U.S. News & World Report and other highly regarded opinion modifiers seem to echo a quote from The Philadelphia Inquirer (11/5), "Dawn of a service industry: personal-computer repairs." The recent (January 14, 1983) Computer Service Advisory Committee very strongly supported the need for well-educated individuals in this expanding field.

Potential Employers (Delaware Valley)

Allen-Myland, Inc. (IBM)
515 Abbott Drive
Broomall, PA 19008

AM International
9 Presidential Blvd.
Bala Cynwyd, PA 19004

Bunker Ramo
129P Gaither Drive
Mt. Laurel, N.J. 08054

Data General Corp.
2000 Market Street
Philadelphia, PA

Gordon Cash Register Exchange
1015 Ridge Avenue
Philadelphia, PA 19154

Hewlett-Packard
1021 Eighth Avenue
King of Prussia, PA 19406

Honeywell, Inc.
121 Presidential Blvd.
Bala Cynwyd, PA 19004

Intel Corporation
510 Pennsylvania Avenue
Ft. Washington, PA 19034

Kalbro
101 Foster Road
Moorestown, N.J. 08057

Mohawk Data Sciences Corporation
Kor Center A
Trevose, PA 19047

National Computer Systems
3 Neshaminy Interplex - Suite 111
Trevose, PA 19047

N.C.R. Corporation
78 Great Valley Parkway
Malvern, PA 19355

Radio Shack
Manoa Shopping Center
Havertown, PA 19083

RCA Data Services
102 Gaither Drive
Mt. Laurel, N.J. 08054

Scopus Corporation
1015 Chestnut Street, Suite 920
Philadelphia, PA 19107

Sorbus
Frazer
Pennsylvania, 19355

Sperry Univac
Blue Bell
Pennsylvania, 19424

Tektronic, Inc.
1720 Walton Road
Blue Bell, PA 19422

Texas Instruments, Inc.
575 Virginia Drive
Ft. Washington, PA 19034

Xerox Corporation
150 Monument Road
Bala Cynwyd, PA 19004

Zyco Mfg. Inc.
46 Darby Road
Paoli, PA 19301

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COMPUTER SERVICE TECHNOLOGY

First Semester	Credit(s)
Basic Tech. Skills TEC. 115	3
Technical Math I MAT. 110	4
Technical Physics I PHY. 100	3
Electric Circuits TEL. 101	4
Communications I ENG. 101	3
	17
Second Semester	
Computers in Problem-Solving MAT. 135	3
Electric Power TEL. 102	4
Digital Electronics TEL. 121	4
Electronics I TEL. 110	4
	15
Third Semester	
Technical Math II MAT. 111	4
Electronics II TEL. 111	4
Public Speaking ENG. 120	3
Microprocessor Electronics TEL. 122	4
Communications II ENG. 102	3
	18
Fourth Semester	
Industrial Electronics TEL. 131	4
*Computer Systems Electronics TEL. 123	5
Human Relations SOC. 100	3
Tech. Elective or CSEL	3
	15

*New Course

12/82; Rev. 1/13/83, 1/18/83

Program

The Computer Service Technology program has been developed in an attempt to address a critical need; that is, educating individuals that will have marketable skills and knowledge for the immediate future and not be displaced in one-to-three years because of inadequate preparation. Additional constraints were placed on the program by the curriculum developers at the College, including:

* should be certificate as well as associate degree
* should be attainable full-time, part-time, day and evening
* must build upon a majority of the courses which presently exist, especially the electronics program.
* would appeal to individuals employed in related fields

Reviewing the constraints, should the program be certificate as well as associate degree, was explored with the program advisory committee. The Committee did not strongly support the certificate portion of the total curriculum package. The major reason for lack of support was the inability of a certificate program to address all or most of the program objectives, especially the objectives dealing with Human Relations and Public Speaking. The need to communicate and tactfully handle potentially volatile situations was seen to be equally, if not more, important than technical sensibility. Therefore, the curriculum planners were not comfortable with proposing a certificate track.

However, it could be that as this industry expands and more needs become apparent for bench (in-house) repair individuals, that a proposal will be forthcoming for a certificate. In the foreseeable future, computer service organizations will become as commonplace as radio and television repair. But, that step seems, for the time-being, a little in the future. Therefore, at the present time only one program is being proposed. The program would be an Associate of Science in Computer Service Technology (AAS).

The program as described on page 6 lists the required courses. These courses were selected to address the major program objectives described earlier. In order to add program validity, the materials (program) are the result of an extensive review of literature (including materials from the Institute of Electrical and Electronics Engineers and their educational branch), a survey of tasks from potential employees, review of similar programs at other community colleges (including College of the Redwoods, California), and a final review of the program advisory committee.

The only completely new course in this program is Computer Systems Electronics (TEL. 123). Although the specific course competencies have not been developed, the major components are well-established. It is expected, because of the importance of this particular course to the overall program, that some time will be spent to develop top quality curricular materials. It is not projected to offer this particular course for at least one, possibly two years; therefore, an extensive search of materials can be carried out and completed in a timely manner.

Cost of the Program

The cost of this program would be consistent with the cost of other technology programs at the College. A great deal of special capital equipment and special facilities are not necessary to conduct the program. Most, if not all, of the electronics courses can be conducted in the present electronics laboratory. The proposed programs have only created one entirely "new" course, that is, Computer Systems Electronics. This course is five credits (3 lecture and 4 laboratory). Therefore, the curriculum planners feel the addition of the five-credit course is not proliferating unnecessary courses and at the same time were developing a creditable program.

However, in an effort to make a long story even longer, the exact program costs cannot be estimated but are not projected too much different from: electronics, drafting and design, solar and other technology programs.

Capital Cost

A preliminary (fall, '82) grant was developed for vocational funding in anticipation of this program. The items and costs are expressed below:

DVM's	$ 5,000
Dual Trace Oscilloscopes	5,000
Four-Channel Oscilloscope	4,000
Microcomputers with Fault Switches	2,200
8-K Memory	700
Terminal and printer	1,500
Microcomputer trainers	11,700
Microcomputer terminals	6,300
Logic probes and pulsars	1,800
Shipping and installation	1,000
Institutional materials	2,000
Curriculum development	5,000
	$46,200

Additionally, on November 12, 1982, Miller and McQuay requested about the same "bottom-line" dollars from the Ben Franklin Partnership in support of this program. The 1983-84 DCCC budget request for this program amounted to $10,000. To date, none of the above-named sources have materialized. However, it is the feeling that using the base already established, approximately $50,000 in capital would move this program along quite well.

There are some safety valves and breathing room, in terms of expenditure; that is, since the only completely new course is in the fourth semester, the necessity to commit (expend) funds can be delayed by one year. However, the curriculum planners feel it is wise to begin purchasing as soon as possible, with some purchasing to begin July 1, 1983. This timing will allow for check-out, and instructor familiarization of the equipment.

Enrollments

No single industry is moving faster and encompassing as many peripheral industries as the computer. Along with this growth will come technicians to support it. First-year enrollment, because of lateness, newness to college and a host of factors will be small, n = 10. Second year should represent rapid growth, n now equal to 30-40 students enrolled in the program, full-time and part-time. Eventual capacity of program will be limited by the industry (number of job openings) and number of work stations available to teach electronics.

The advisory committee strongly supported the enrollment projection presented. They seemed to allude that the college was somewhat conservative with their projections. If this program can meet with all the necessary approvals in a timely manner, an extensive advertising campaign can be conducted to notify the public of this program. Methodologies used to disseminate this information include:

* spot releases in the media
* addendum to college catalog
* notification of local schools
* notification of local industries

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APR 22 1986